THE GARDEN CALENDAR

A radio discussion by W. R. Beattie and A. C. Foster, Bureau of Plant Industry, delivered in the Department of Agriculture period of the National Farm and Home Hour, over a network of 49 associate NBC radio stations, Tuesday, March 28, 1933.

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BEATTIE:

You folks who are growing fruits and vegetables, either for home use or for sale, know from bitter experience that plant diseases often make a big hole in your profits. We have the parasitic diseases such as the rusts, mildews and blights that are caused by some fungus on the foliage or in the tissues of the plants. We have the virus diseases that work entirely inside the plants; then we have a class of diseases that we can't trace to any definite organism but they cause a general breakdown of some part or all of the plant. Our first job is to determine the nature of any new disease, then find a remedy. Sometimes the remedy consists of removing the cause of the trouble. A few years ago Florida's four million dollar celery crop was threatened by a disease known as "black-heart" and for a time it looked as though the winter celery growers in Florida were going to be put out of business. Mr. A. C. Foster, who is here with me today, was sent into the winter celery growing sections to see what could be done to control this trouble. What did you find Mr. Foster?

FOSTER:

Well, Beattie, I found a lot of discouraged celery growers. First, I'd like to say that this celery blackheart disease is scattered all over the country wherever celery is grown. The annual loss to Florida growers has been about five per cent of their four million dollar crop, and some growers have lost their <u>entire</u> crop.

BEATTIE:

Where else has black-heart been serious?

FOSTER:

Reports indicate that often sixty per cent of individual plantings of celery in Utah are lost. We have similar reports from California, Wisconsin, New Jersey and the prevalence of the disease in Texas so discouraged the celery growers that they quit growing the crop. From this you'll see that the disease is widespread and serious.

BEATTIE:

Foster, suppose you tell us what kind of a disease celery blackheart is?

FOSTER:

Well Beattie, to begin with it is what we call a non-parasitic disease. That is, we can't trace it to any fungus or parasitic organism. It is caused by a sudden unbalancing of growth relations in the plants.

BEATTIE:

Sort of a case of indigestion in the plant I take it.

(over)

FOSTER:

That's right, and it attacks mainly the tender growing leaflets in the center of the plant. First the tips and the margins of the young tender leaves look like they had been scalded in spots. Later these spots turn brown, then they become blackened and so the disease is called "black-heart." Celery plants may have four or five attacks of the trouble and apparently recover, but as the celery approaches maturity the black-heart usually destroys the entire crown or center of the plant in a few days. Even mild attacks of black-heart in the field are usually followed by secondary decay in transit or in storage causing further heavy losses.

BEATTIE:

Foster, you said a moment ago that celery black-heart is not caused by a parasite. In other words it is some special growth condition that causes it. What did you find to be the real cause of the trouble?

FOSTER:

Either too much or too little water in the soil will cause it. Under most conditions drought is the cause, but, excessive soil moisture due to heavy rains or over-irrigation may be responsible. Heavily fertilized, vigorous, rapidly growing plants are affected more severely than slowly growing, lightly fertilized plants. Too much irrigation water apparently kills the root hairs that absorb moisture into the plant, then the plant suffers for moisture, even with plenty of water in the soil.

BEATTIE:

You say that the light fertilized plants suffer less from black-heart?

FOSTER:

Yes. In Florida, I found that where the celery growers used only <u>one</u> ton of fertilizer per acre no black-heart developed but, where the growers used as high as <u>six</u> tons per acre the loss was sometimes as high as 80 per cent. I want to say, however, that where growers regulated irrigation carefully they held the disease under control regardless of the amount of fertilizer applied. Of course the type of soil has considerable to do with the control of the disease and the Florida growers have had more trouble on the light sandy soils than on the muck soils. This indicates that it is easier to maintain a soil moisture balance in the much soils of a high water holding capacity.

BEATTIE:

Does celery black-heart develop more rapidly in warm weather?

FOSTER:

Yes, for the reason that warm weather promotes a rapid, soft growth. In addition high temperatures usually cause a more rapid evaporation of moisture both from the soil and from the plants and that produces the same effect as drought in both the soil and the plant. In other words you want a steady, balanced water relation in the soil. Temperature, rainfall, or anything else that destroys this balance will bring on the celery black-heart disease.

BEATTIE:

I've heard celery growers say that they were using side dressings of nitrate of soda and other quickly available forms of nitrogen in an effort to grow the celery <u>out</u> of the diseased condition. Would that help any in fighting a bad case of black-heart?

FOSTER:

No. In fact it would probably increase the trouble. We've found that the form of the nitrogen has very little to do with it. It's the quantity and the heavier the application the greater the danger of black-heart unless moisture conditions are kept just right. Strange as it may seem the fertilizer formula that produced the best growth when applied in large amounts, also produced the largest number of diseased plants, showing further the relation of vigor and excessive fertilizing to the prevalence of black-heart. Furthermore, liberal applications of superphosphate alone are beneficial in checking the spread of the disease.

BEATTIE:

We've heard a lot lately about disease resistant varieties of vegetables. Any chance of getting varieties of celery that will be resistant to black-heart?

FOSTER:

Yes, there is a chance. In fact many of the newer strains of celery, such as Meisch's Special or Wonderful, and the Golden Plume are decidedly resistant. The disease attacks all known varieties of celery but the severity of attack is less on the dark colored and slow-branching strains.

BEATTIE:

Summing it all up then Foster, what would you say are the main points to look out for in order to control celery black-heart?

FOSTER:

First of all I'd say - plant your celery on land that contains plenty of humus and which will maintain a rather uniform moisture content. Second, plant only those varieties that show the greatest resistance to diseases. Third, limit your fertilizer applications to the amounts that the plants can use without producing an excessive growth. Fourth, irrigate moderately and be careful that your soil does not become oversupplied with moisture, and at the same time you want to be careful that the celery plants do not suffer for lack of moisture.

BEATTIE:

Now Foster, we've been talking about celery black-heart, a non-parasitic disease. So far as we know, there really is no trace of a disease organism present; just a breakdown of the tissues due to a very rapid growth and then a sudden change in the moisture supply. So much for the black-heart, but, what about virus diseases of celery?

FOSTER:

Well Beattie you know celery is subject to a Mosaic disease that causes the young leaves to become slightly yellowed and mottled, then they gradually develop a bleached appearance and turn downward. At the same time the leafstalks or edible protion of the celery may show a brownish discoloration and shrivel so that they're unfit for use. It has recently been found that this is a Mosaic or virus disease affecting celery. And there is a queer thing about this disease for the virus that causes it doesn't carry over on the seed or remain in the soil from one season to another like many similar diseases. But, it does live over in a common weed, the Commelina, known as "creeping dayflower" and in Florida as "wild wandering Jew."

BEATTIE:

And, I suppose the Mosaic disease is in some way transmitted from the Dayflower weed to the celery plants?

FOSTER:

Yes, and that's another interesting thing in connection with the spread of this and other virus diseases. You see, an aphid, or plant louse, which is very abundant on celery in Florida, also feeds on the wild creeping dayflower and readily carries the virus from the mosaic dayflower plants to the healthy celery. This is especially noticeable where the mosaic diseased weeds occur in patches along the edges of the celery fields.

BEATTIE:

And, I suppose the remedy is to dig out and burn all of the wild dayflower weed that is found growing near the celery fields?

FOSTER:

That's right, and it's not difficult to destroy the weeds. In experiments conducted a couple of years ago we found that by careful weed eradication the losses from Mosaic were reduced from 60 to 80 per cent down to about 6 per cent.

BEATTIE:

Thank you Mr. Foster. Now folks, we haven't said anything about the so-called parasitic diseases of celery such as rust, leaf-blight and other diseases which may be prevented or controlled by spraying and dusting with copper compounds and other chemicals. But, I think we've given you an idea of the extent to which the celery growers depend upon the scientific workers of the Department and of the State Colleges and Experiment Stations for help in solving their plant disease problems. And, if nothing happens to prevent I'll be with you again next Tuesday.